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ABSTRACT

Designed to test the effect upon comprehension of repatterning passages from a tenth grade social studies text by approximating the syntactic patterns found in a transformational analysis of the writing of the tenth grade subjects expected to read the text, this instrument was applied to 34 subjects who were asked to write 1,000 words of prose dealing with social studies content. The writing was segmented into T-units which were analyzed to quantify the frequency of use of each of 51 different transformations, and a synopsis of clause of sentence length factors was derived. Eight social studies passages were subjected to identical analysis, repatterned, and constructed with the original versions into a multiple choice test. Results showed significantly more correct responses to cloze items based upon the repatterned passages. [This document is one of those reviewed in The Research Instruments Project (TRIP) monographs "Measures for Research and Evaluation in the English Language Arts" to be published by the Committee on Research of the National Council of Teachers of English in cooperation with the ERIC Clearinghouse on Reading and Communication Skills. A TRIP review which precedes the document lists its category (Reading), title, author, date, and age range (senior high), and describes the instrument's purpose and physical characteristics.] (JM)

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CS 201 374

NATIONAL COUNCIL OF TEACHERS OF ENGLISH
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Category: Reading

Title: "Linguistic Analysis Worksheet"

Author: Fillmore K. Peltz

Age Range: Senior High

Description of Instrument:

Purpose - To test the effect upon comprehension of repatterning passages from a tenth grade social studies text by approximating the syntactic patterns found in a transformational analysis of the writing of the tenth grade subjects expected to read the text.

Date of Construction - 1971

Physical Description - Thirty-four subjects were asked to write 1,000 words of prose dealing with social studies content. The writing was segmented into T-units, and a "synopsis of clause to sentence length factors" was derived. Each of the approximately 2,500 T-units generated was analyzed by means of a Linguistic Analysis Worksheet used to quantify the frequency of use of each of 51 different transformations. The derived data were reduced to a mean representing the number of times each transformation was generated per 100 T-units generated by the subjects. Eight social studies passages, consisting of approximately 125 T-units, were subjected to identical analysis. Means were then computed which projected a proportional approximation of the subjects' use of each transformation had they written the 125 T-units. The passages were repatterned, and 16 cloze comprehension tests were constructed over each of the eight original and eight repatterned passages. A single multiple-choice test was constructed for both the original and repatterned versions of each of passages two, four, six, and eight. While there was no significant difference in the number of correct responses to the multiple-choice questions, the results showed significantly more correct responses to cloze items based upon the repatterned passages.

LINGUISTIC ANALYSIS WORKSHEET

_____Student Number _____Composition Number _____T-unit Number

T-unit_____

_____

_____

1. _____ Words in T-Unit

	I. SIMPLE TRANSFORMATIONS	EXAMPLE
2. _____	There-Verb-Subject	There was a bird in the tree.
3. _____	It-Verb-Subject	It is my home.
4. _____	Nominative-Direct Object-Verb Passive	Money was given to the boy.
5. _____	Nominative-Indirect Object-Verb Passive	The boy was given money.
6. _____	Question	Are you going to the game?
7. _____	Negation	He did not see the mirage.
8. _____	Negation-shift	I didn't advise him to go.
	II. EMBEDDING TRANSFORMATION	
	A. Noun Replacement	
	(1) Nominal Clauses	
9. _____	That + Sentence as Subject	That I am failing disturbs me.
10. _____	That + Sentence as Object	I believe that he is right.
11. _____	(That) + Sentence as Object	I know (that) he is diligent.
12. _____	Wh + Sentence as Subject	What he has learned pleases me.
13. _____	Wh + Sentence as Object	I know what annoys him.
14. _____	Wh + ever as Subject	Whatever is silly amuses him.
15. _____	Wh + ever as Object	She says whatever comes to mind.
	(2) Nominal Phrases	
16. _____	Infinitive as Subject	To appear on TV is exciting.
17. _____	Infinitive as Object	I tried to answer.
18. _____	Gerundive as Subject	Tom's hot rodding worried Mother.
19. _____	Gerundive as Object	Selma resented his complaining.
20. _____	Derived Noun Phrase as Subject	The handsome driver was rude.
21. _____	Derived Noun Phrase as Object	He arrested the reckless speeder.
22. _____	Prepositional Phrase as Subject	On the mantle is where it belongs.

B. Noun Expansion

(1) Relative Clauses

23. _____ Relative Clause (Be) — I admire Tom, who is a scholar.
24. _____ Relative Clause (Have) — The book, which had no index, proved useless.
25. _____ Relative Clause (Verb) — The boy, who scored the goal, was cheered.
26. _____ Adverbial Clause of Time — You may to (at the time) when you wish.
27. _____ Adverbial Clause of Place — You may go (to that place) where you wish.
28. _____ Adverbial Clause of Manner — You may travel (in the manner) how you choose.
29. _____ Adverbial Clause of Motive — You may tell (the motive) why you did it.

(2) Post-Noun Relative Phrases
(Derived in the reduction of relative clauses.)

30. _____ Prepositional Phrase — The boy (who was) on the field scored yesterday.
31. _____ Genitive Phrase — The sound (which is) of the bell startles him.
32. _____ Participial Phrase — The boy (who is) frightened by the bell is pale.
33. _____ Infinitive — He is the man (who is) to go.
34. _____ Infinitive Phrase — Mary is the one (who is) to go home.
35. _____ Appositive Phrase — John, (who is) the doctor, is my friend.

(3) Relative Words

36. _____ Adjective — a handsome lad
37. _____ Participle — a broken dish
38. _____ Possessive — my ball
39. _____ Participial Compound — the full-blown argument
40. _____ Adjunct in Endocentric Compound Noun — greenhouse
41. _____ Adverb — the man outside

C. Extraposition

42. _____ That clause insertion — There is so much hatred that they cannot agree.

III. CONJOINING TRANSFORMATIONS

A. Conjunctions Joining Independent Clauses

Left	/Right (Branching)	
_____43.	_____Additive	and
_____44.	_____Adversative	but

B. Conjunctions Joining Dependent Clauses

Left	Right (Branching	
_____45.	_____Causal	because
_____46.	_____Conditional	if
_____47.	_____Concessive	although
_____48.	_____Illative	from
_____49.	_____Purposive	for
_____50.	_____Disjunctive	or
_____51.	_____So	
_____52.	_____Then	

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Fillmore K. Peltz
"Linguistic Analysis Worksheet"
1971

Abstract

Tested the effect upon comprehension of repatterning passages from a tenth grade social studies text by approximating the syntactic patterns found in a transformational analysis of the writing of the tenth grade subjects expected to read the text. Thirty-four subjects were asked to write 1,000 words of prose dealing with social studies content. The writing was segmented into T-units, and a "synopsis of clause to sentence length factors" was derived. Each of the approximately 2,500 T-units generated was analyzed by means of a Linguistic Analysis Worksheet used to quantify the frequency of use of each of 51 different transformations. The derived data were reduced to a mean representing the number of times each transformation was generated per 100 T-units generated by the subjects. Eight social studies passages, consisting of approximately 125 T-units, were subjected to identical analysis. Means were then computed which projected a proportional approximation of the subjects' use of each transformation had they written the 125 T-units. The passages were repatterned, and 16 cloze comprehension tests were constructed over each of the eight original and eight repatterned passages. A single multiple-choice test was constructed for both the original and repatterned versions of each of passages two, four, six and eight. While there was no significant difference in the number of correct responses to the multiple-choice questions, the results showed significantly more correct responses to cloze items based upon the repatterned passages.

The Effect Upon Comprehension of Repatterning Based on Students' Writing Patterns[1]

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There is mounting concern for understanding all aspects of language as they relate to the reading process. In this study, syntactic patterning was considered as an aspect of language which, when analyzed in terms of a psycholinguistic model of the reading process and a generative-transformational grammar, might yield insights regarding the competence and performance of the reader.

The Problem

The investigator assumed that patterning is a factor within both the linguistic expectations of the reader and the language production of the writer. This assumption grew out of two distinct theoretical constructs: 1) that reading is a psycholinguistic process in which the reader, an active language user, is influenced by personal linguistic expectations and experience, both of which have an effect upon his perception even before he begins the reading process (Goodman, 1970); and 2) that language can be effectively described in terms of a generative-transformational grammar which postulates that the writer's deep structure (concept) is generated into a surface structure (words, phrases, clauses, etc.) as a consequence of the interaction and application of certain grammatical transformations (Noam Chomsky, 1965).

A writer's linguistic expectations and experience influence his system of grammatical relations, the nature and extent of his lexicon, and his application of both necessary and optional grammatical transformations. Hence, it was postulated that the reader's approach to graphic, syntactic, and semantic perceptual input was a consequence of personal expectations and experience which could be markedly different from those of the writer. If this were the case, the expectations of the reader might be very difficult to reconcile with the structures generated by the writer.

Related Literature

Researchers attempting to quantify syntactic patterning have moved from analyses of a purely structural nature to those in which the insights provided by a transformational grammar have been applied. Subsequent researchers have added the complementary theory of reading as a psycholinguistic process, and have used the results of the research dealing with syntactic language patterning in an attempt to isolate syntactic factors which seem to have an effect upon the reader's comprehension.

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[1]This article is a summary of a doctoral dissertation prepared under the direction of Professor H. Alan Robinson at Hofstra University.

Structural Linguistics

Harrell (1957), Strickland (1962), and Loban (1963) used structural linguistics as a tool with which to analyze children's language and revealed that the frequency with which specific linguistic structures were used by individual subjects at different grade levels could be quantified. Ruddell (1963) and Tatham (1968, 1969) demonstrated that the comprehension scores on reading passages that utilized high frequency patterns of oral language structure were significantly higher than the comprehension scores on reading passages based on low frequency patterns.

Transformational Grammar

Menyuk (1963), Loban (1963), Hunt (1965, 1966, 1970), Griffin (1966), O'Donnell, Griffin, and Norris (1967), Goodman and Burke (1969), and Carol Chomsky (1969) used transformational grammar as a tool with which to analyze language. Their studies revealed that the quantity and/or quality of transformations used by different subjects at varying levels of linguistic development could be measured.

Coleman and Blumenfeld (1963), Coleman (1964, 1965), Fagan (1970), and Smith (1970) demonstrated that the quality and/or quantity of transformations generated by the author had an effect upon the comprehension of the reader. Hittleman (1970) concluded that subjects do attempt to readjust the syntactical pattern of passages in order to gain meaning.

Purpose of the Study

The specific purpose of this study, then, was to determine the effect upon the average tenth grade learner's comprehension of repatterning representative passages from a tenth grade social studies text. Eight passages were repatterned to proportionally approximate the syntactic patterns found in a transformational analysis of the writing of the tenth grade subjects expected to read the text.

Definitions

1. Average: Reading at the fifth stanine on the Metropolitan Reading Test, Form F, Advanced.

2. Representative Reading Material: Passages which the subjects were expected to read and which were written in an expository style.

3. Transformational Analysis: A linguistic analysis based primarily upon the quantification of embedded nominal structures which replace or expand nouns.

4. Repatterning: Using optional transformations primarily to change nominal structures which exceed the frequency of use demonstrated by the subjects into either active verbs or adverbial structures.

5. Comprehension: Number of items correct on either cloze or multiple-choice tests.

Hypotheses

The following research hypotheses were tested:

1. Proportionally approximating the syntactic patterns of the written language of average tenth graders to repattern representative tenth grade reading material will have a positive effect upon the tenth grade learners' comprehension as measured by cloze test scored by exact words.

2. Proportionally approximating the syntactic patterns of the written language of average tenth grade learners to repattern representative tenth grade reading material will have a positive effect upon the tenth grade learners' comprehension as measured by cloze test scored by acceptable synonym and exact word.

3. Proportionally approximating the syntactic patterns of the written language of average tenth grade learners to repattern representative tenth grade reading material will have a positive effect upon the tenth grade learners' comprehension as measured by multiple-choice test.

Design of the Study

The investigation necessitated a descriptive phase in which both the writing of the tenth grade subjects and the representative passages were analyzed, and an experimental phase in which the passages were repatterned and the subjects were tested on their comprehension of both the original and the repatterned versions.

The Sample

The sample consisted of 34 students randomly chosen from the tenth graders who would be in English classes from January through June, 1971 (the period of the study) and who were reading within the fifth stanine on the Metropolitan Reading Test, Form F, Advanced. The subjects attended Springfield Gardens High School, a large, integrated, urban school serving approximately 4,000 students in Queens, New York.

The Representative Passages

The researcher used a social studies text since confounding variables related to sylistic factors, specialized vocabulary,

and the progressive development of abstract concepts were present to a considerably lesser degree than they would have been in English, science, or mathematics texts. The Record of Mankind by Roehm, et. al. (1970) was chosen as the representative reading material since 1) it was a text which the subjects were expected to read; 2) it had not been previously read, and 3) it was written in an expository style. The specific passages to be analysed and repatterned were selected following the procedures outlined by Strickland (1962).

Instruments

Linguistic Analysis Worksheet. The investigator used insights derived from research by O'Donnell, Griffin, and Norris (1967), Bateman and Zidonas (1966), Mellon (1969), and Hunt (1965, 1966, 1970) to develop an analytic instrument designed to quantify the frequency with which 51 different transformations were generated both by the subjects and by the authors of the representative passages. The instrument was used to consider each T-unit in terms of seven types of simple, 34 types of embedding, and 10 types of conjoining transformations. The 34 embedding transformations quantified instances in which embedded clauses and phrases replaced nominal structures, and in which embedded clauses, phrases, and words expanded nominal structures. Each such transformation was interpreted as an example of an embedded kernel sentence: that is, the embedding of an additional concept into an existing structure.

Cloze Comprehension Tests. Following the procedure outlined by Taylor (1953), the investigator developed a cloze comprehension test over each of the eight unaltered and eight repatterned passages. Each test required that the subject supply the deleted fifth word from the beginning of the passage and every fifth running word thereafter. Each test item was represented in the passage by a 12 space blank left in place of the deleted word.

Multiple-choice Comprehension Tests. The suggestions of Davis (1964) were incorporated into the construction of a multiple-choice test for each of passages two, four, six, and eight. These same tests were used to measure the comprehension of the respective passage in both their unaltered and their repatterned versions. Each test consisted of five multiple-choice items. The subjects were instructed to select the best answer of the four choices presented for each item.

Treatment of the Data. The data relevant to the language analysis were tested by means of the Mann-Whitney Non Parametric U. This statistic was used in order to determine the population for which the frequency of use of specific syntactic structures was stochastically larger at or beyond the .05 confidence level. The data relevant to comprehension (the research hypotheses) were tested by analysis of variance. The required level of significance was .05.

Procedures

Collection of the Writing Sample

Since the subjects were asked to generate 1,000 words of prose, the investigator selected the English classroom as the most natural setting for this study and programmed the 34 subjects into a single English class. He then prepared four essay questions each of which was designed both to elicit 250 words responses within the content area of social studies and to be consistent with the goals of the English curriculum. Thus, the writing of the essays was supervised by the English teacher and incorporated into the standard English lessons. After each writing, the researcher photographically reproduced the completed essays and returned the originals to the English teacher.

Analysis of the Writing Sample

Each of the writing samples of each subject was then analyzed within the framework of a transformational grammar. First, the writing sample was divided into T-units. Hunt (1965) defined T-units as "the shortest grammatically allowable sentences into which the theme could be segmented." The advantage of using the T-units as an index of length was that it eliminated subjective decisions based upon the analysis of sentences composed of a number of simple and/or complex sentences run together with ands or buts.

After the writing sample was divided into T-units, the following guidelines were observed:

1. T-units which were essentially restatements of the essay question and which used its language were discarded since these T-units duplicated the patterning used by the investigator and were not generated by the subjects.

2. A-syntactic expressions, fragments, and parenthetical expressions found in conversation were discarded since such structures supplied too little information for objective analysis.

3. Independent clauses which served as direct quotations counted as T-units. Speaker tags (e.g. "he said") were not treated as separate T-units since these tags were invariably composed of only two words; consequently, counting them as T-units would have given an inaccurate picture of mean T-unit length.

Every T-unit of each writing sample was analyzed (approximately 2,500 T-units), and the results of the total analysis were cast into 15 measures. Measures one through nine were used earlier by Hunt (1965), and measures 10 through 15 were used by Mellon (1969):

1. Number of words
2. Number of T-units
3. Number of sentences
4. Number of clauses
5. Mean length of sentences
6. Mean length of T-units
7. Mean length of clauses
8. Mean number of clauses per T-unit
9. Mean number of T-units per punctuated sentence
10. Number of instances, per 100 T-units, of the embedding of a nominal clause replacing a noun
11. Number of instances, per 100 T-units, of the embedding of a nominal phrase replacing a noun
12. Number of instances, per 100 T-units, of the expansion of a nominal by the addition of a relative clause
13. Number of instances, per 100 T-units, of the expansion of a nominal by the addition of a relative phrase
14. Number of instances, per 100 T-units, of the expansion of a nominal by the addition of a relative word
15. Total number of instances, per 100 T-units, of embedding (items 10 through 14)

These measures were derived for each writing sample, for all writing samples generated by a single subject, and for the total writing sample generated by all 34 subjects.

The eight representative passages were subjected to identical analysis, and the resultant means then served as a basis for syntactic comparison.

The Repatterned Passages

The investigator repatterned the representative passages by proportionally approximating the frequency with which each of the 51 different transformations would have been generated had the subjects written the passages. First, the number of T-units in the representative passages was adjusted to reflect the number of T-units which the subjects would have generated had they written an equivalent number of words. The adjusted figure was arrived at by dividing the total number of words in the representative passages by the mean number of words per T-unit generated by the subjects:

$$\frac{\text{Total number of words in representative passages}}{\text{Mean number of words per T-unit generated by the subjects}} = \text{Adjusted total number of T-units}$$

Then, the projected frequency of each transformation was calculated by computing the following ratio:

$$\frac{\text{Adjusted total number of T-units}}{\text{Total number of T-units in the subjects' essays}} = \frac{\text{X (Projected frequency)}}{\text{Frequency with which the transformation was generated per 100 T-units in the subjects' essays}}$$

Repeated computations of this ratio projected a proportional approximation of "X," the frequency with which the subjects would have used each embedding transformation had they written the 2,074 words which comprised the original passages. (The repatterning was executed over all eight passages since the individual passages were composed of so few T-units that a proportional approximation of the frequency of use of a single embedding transformation often resulted in a product of less than .5, thereby eliminating a transformation which the subjects had, in fact, used.) Guided by the projected frequency of use of each embedding transformation, the investigator developed the repatterned passages. The repatterning was accomplished by eliminating transformations which exceeded, and incorporating transformations which fell short of, the frequency projected for the subjects. It was the investigator's belief that truly deleting words and phrases would, as a necessary consequence, reduce the level of vocabulary difficulty, thereby confounding the results of the study. Consequently, in most instances, the words and phrases which had been embedded nominal structures were "eliminated" in that they were changed, through the use of optional transformations, into active verbs and adverbial structures. (Coleman (1964) found that subjects answered significantly more questions in response to material in which nominalizations were transformed to active verbs and adjectivalizations were transformed into adverbial forms.)

Construction and Administration of the Comprehension Tests

Sixteen cloze and four multiple-choice tester were developed and administered to the total group of subjects. (Both cloze and multiple-choice tests were used in order to gather data bearing upon factors contributing to comprehension. Cloze tests appear to be more global in nature and more directly related to the measurement of the syntactic factors.)

The tests were administered to the subjects in six testing sessions. Half the cloze and all the multiple-choice tests were administered in four testing sessions each of which lasted approximately 40 minutes. The 34 subjects were divided into two groups of 17. Each group of 17 subjects took eight tests administered in the following order:

	Test Session 1	Test Session 2	Test Session 3	Test Session 4
Group 1	P1UC,P4RM	P2UM,P3RC	P5RC,P8UM	P6RM,P7UC
Group 2	P2RM,P3UC	P1RC,P4UM	P6UM,P7RC	P5UC,P8RM

P=Passage R=Repatterned U=Unaltered C=Cloze M=Multiple-choice

This procedure was followed in an attempt to control variables related to the interaction of the order of administration of the different tests presented with the main effect. However, it accounted for the effect of repatterning upon comprehension, as measured by cloze test, for passage one, three, five, and seven only. In like manner, the effect of repatterning, as measured by multiple-choice test, was measured for passages two, four, six, and eight only. Since the subjects' use of syntactical patterning had been proportionally approximated across all eight passages, the investigator administered cloze tests for passages two, four, six, and eight in order to gather data bearing upon a single comprehension measurement across all eight passages. Eight additional cloze tests were administered in two, 40 minute testing sessions. Each group of 17 subjects took four tests administered in the following order:

	Test Session 5	Test Session 6
Group 1	P2RC,P4UC	P8UC,P6RC
Group 2	P6UC,P8RC	P4RC,P2UC

Scoring. Two separate scores were computed for the cloze comprehension tests: 1) exact word entries were counted correct and credited with one point; 2) exact words were credited with one point, and acceptable synonyms were credited with one half point.

The multiple-choice tests were scored by awarding one credit for each item in which the best answer was indicated.

Findings

The Syntactic Analysis

Synopsis of clause to sentence length factors. Five ratios were derived from the analysis of both the subjects' writing sample and the representative passages. In Table 1 below, from "Mean number of words per clause" down to "Mean number of words per sentence," the ratios are cast into the following equation:

Mean Number of Words Per Clause	x	Mean Number of Clauses Per T-Unit	=	Mean Number of Words Per T-Unit	x	Mean Number of T-Units Per Sentence	=	Mean Number of Words Per Sentence

Table 1 Synopsis of clause to sentence length factors

Measures	Subjects	Authors
Mean number of words per clause	7.77	11.42**
Mean number of clauses per T-unit	1.56	1.44
Mean number of words per T-unit	12.12	16.45**
Mean number of T-units per sentence	1.24	1.08
Mean number of words per sentence	15.03	17.70**

**Statistically significant at .01 level (Mann-Whitney)

While the mean number of words per sentence, per T-unit, and per clause were demonstrated to be (stochastically) greater (beyond .01) for the authors than for the subjects, there was no significant different (.05) in the use of either subordinate or coordinate constructions.

Embedding transformations. Thirty-four different types of embedding transformations were analyzed. Fifteen of these transformations were at the clausal level and served to provide greater specificity regarding the ratio reflecting the number of subordinate clauses used per T-unit; the remaining 19 transformations were at the phrase and word levels and provided an analysis of transformations used within clauses. Table 2 below presents the analysis of the number and type of embedding transformations used to replace or expand nominal structures.

Table 2 Number and type of embedding transformations per 100 T-units

Type of embedding transformation [a]	Subjects	Authors
Noun replacement		
Nominal clauses	19.16	16.75
Nominal phrases	20.83	44.63
Noun expansion		
Relative clauses	15.51	12.13
Relative phrases	50.42	177.13
Relative words	93.15	210.63
Total	199.07	461.27*

[a] Consistent with the findings of Hunt (1965) these measures were limited to nominal structures and their modifiers.

* Significant at .05 level (Mann-Whitney)

The authors embedded fewer nominal and relative clauses than did the subjects. At the phrase level, the authors embedded more than twice the number of kernel sentences by using nominal phrases to replace nouns; when expanding nouns, they generated almost four times the number of relative phrases and more than twice the number of relative words. The total number of kernel sentences generated per 100 T-units was stochastically greater (beyond .05) for the authors than for the subjects.

The Repatterned Passages

The repatterned passages were analyzed in terms of the means measures into which the analysis of the subjects' essays had been cast. In Table 3 below, the repatterned passages are compared to the subjects' essays in terms of both the synopsis of clause to sentence length factors and the total number of embedding transformations per 100 T-units.

Table 3 Summary of mean syntactic measures - repatterned passages versus subjects' essays

Measures	Subjects	Repatterned
Mean number of words per clause	7.77	8.91
Mean number of clauses per T-unit	1.56	1.54
Mean number of words per T-unit	12.12	13.70*
Mean number of T-units per sentence	1.24	1.13
Mean number of words per sentence	15.03	15.49
Mean number of embedded kernel sentences per 100 T-units	199.8	206.3

*
Statistically significant at .05 level (Mann-Whitney)

Synopsis of clause to sentence length factors. The mean number of words per clause and per sentence calculated for the repatterned passages were not significantly (.05) different from the mean number calculated for the subjects' essays. There was no significant difference (.05) in the use of either subordinate or coordinate constructions. The "Mean number of words per T-unit" was stochastically greater (.05) for the repatterned passages than for the subjects' essays. This last finding may have been a result of the fact that, in order to preserve vocabulary difficulty, words and phrases which were used to replace or expand nominal structures with a frequency which exceeded that demonstrated by the subjects were not deleted, but were retransformed into active verbs and adverbial forms.

Embedding transformations. The total mean number of embedding transformations generated per 100 T-units by the subjects was not significantly (.05) different from the total mean number of embedding transformations utilized in the repatterned passages.

The Research Hypotheses

The data collected during the comprehension testing were analyzed by separate one way analyses of variance tests in order to test the main effect, the form of the social studies passages (original versus repatterned). The analyses, designed to test the three research hypotheses, were conducted at the Computer Center, Hofstra University.

The analyses were computed in order to compare the scores on the original passages to those on the repatterned passages for 1) the cloze tests scored by exact word responses; 2) the cloze tests scored by exact word and acceptable synonym, and 3) the multiple-choice tests. The results of the separate analyses are presented in Tables 4, 5, and 6 below.

Table 4 Analysis of variance - cloze test scored by exact word

Source	Sum of squares	d.f.	Mean squares	F ratio
Form of passage	318.656	1.0	318.656	4.627*
Error	18043.000	262.0	68.866	

*Statistically significant at .05 level

Table 5 Analysis of variance - cloze tests scored by exact word and acceptable synonym

Source	Sum of squares	d.f.	Mean squares	F ratio
Form of passage	412.564	1.0	412.564	5.748*
Error	18805.750	262.0	71.778	

*Statistically significant at .05

Table 6 Analysis of variance - multiple-choice test scores

Source	Sum of squares	d.f.	Mean squares	F ratio
Form of passage	0.029	1.0	0.029	0.022
Error	177.030	134.0	1.321	

Each hypothesis postulated that proportionally approximating the syntactic patterns of the written language of average tenth graders to repattern representative reading material would have a significant (.05) positive effect upon the comprehension of those same tenth grade subjects. Hypotheses one and two were supported, and hypothesis three was rejected since it was found that:

1. When measured by cloze test scored by exact word, the subjects' comprehension test scores were significantly (.05) higher for the repatterned passages than for the original passages.

2. When measured by cloze test scored by exact word and acceptable synonym, the comprehension test scores were significantly (.05) higher for the repatterned passages.

3. When measured by multiple-choice tests, the subjects' comprehension test scores on the repatterned passages were not significantly (.05) different from their scores on the original passages.

Delimitations

The results of this investigation are delimited by the following descriptions of the study's sample, instruments, and procedures.

1. The tenth grade sample was made up of average (reading at the fifth stanine on the Metropolitan Reading Test, Form F, Advanced) subjects and was restricted to one high school in Queens, in New York City.

2. The representative reading material was taken from a single social studies text dealing with content the subjects were expected to read in the tenth grade.

3. The transformational analysis was based primarily upon the quantification of embedded nominal structures which replaced or expanded nouns.

4. The repatterning procedure used was primarily one in which nominal structures which exceeded the frequency of use demonstrated by the subjects were changed, through the use of optional transformations, into either active verbs or adverbial structures.

5. Comprehension was defined as number of items correct on either cloze or multiple-choice tests.

Conclusions

1. A transformational analysis of the writing of learners, and of content area materials those same learners are expected to

read, will probably yield syntactic patterns of written language which can be quantified and which demonstrate that the patterns generated by the learners are significantly different from those generated by the authors.

2. When measured by cloze test, proportionally approximating the syntactic patterns of the written language generated by learners to repattern content area materials they are expected to read is likely to have a positive effect upon their comprehension. (When measured by multiple-choice test, preportionally approximating the learners' written syntactic language patterns did not appear to have a positive effect upon the comprehension of those same learners. This result may have been a consequence of the investigator's having constructed too difficult a multiple-choice test instrument, or may underscore an area of considerable concern to current researchers, namely, whether multiple-choice and cloze tests measure the same comprehension factors.)

Implications

The implications presented grow out of the demonstrated importance of both isolating and identifying those syntactic factors which contribute to the linguistic expectations of the reader and the language production of the writer. Consequently, the implications underscore the importance of incorporating a psycholinguistic model of the reading process into teaching, curriculum development, and textbook production as they appear to affect the language experience and expectations of the learner.

Teaching

Teachers should:

1. Become familiar with the level of syntactic maturity which their pupils have reached.

2. Utilize syntactic structures which are familiar to the learner in those activities in which the learner is expected to function independently.

3. Provide for the direct and developmental training of the learner through instructional activities designed to teach syntactic linguistic relationships.

Curriculum Development

Educators responsible for curriculum development should:

1. Incorporate factors contributing to syntactic maturity into curriculum planning pertinent to the teaching of both reading and writing.

2. Structure the curriculum for a given grade so that it provides for direct training, consistent with the learner's experience and expectation, in syntactic relationships.

3. Structure secondary school curricula so that they both provide developmental instruction and encourage syntactic maturity.

Textbook Preparation

Educators and authors should:

1. Ascertain the specific factors contributing to the syntactic expectations of their intended readers.

2. Develop material which proportionally approximates (quantitatively and qualitatively) the level of syntactic maturity demonstrated by the intended readers.

3. Structure materials which both textually complement the learner's syntactic experience and instructionally augment his syntactic expectations.

Suggestions for Further Research

This investigation points to the need for continued intensive research dealing with language analysis, readability, and comprehension.

Language Analysis

The findings highlight the importance of quickly and accurately quantifying significant elements of linguistic patterning. Further research should be conducted in order to:

1. Explore both quantitative and qualitative elements of linguistic patterning.

2. Develop uniform procedures and instruments which can readily and effectively be used to describe the incidence of the different elements of linguistic patterning (simple embedding, conjoining, and deletion transformations as they affect both nominal and verbal structures.)

3. Determine whether norms can be established which accurately isolate and identify elements of linguistic patterning as demonstrated at different grade and ability levels.

4. Determine whether altering the learner's linguistic environment and/or providing for his direct and developmental training will accelerate his linguistic maturity.

Readability

The current research suggests that readability may be influenced by elements of syntactic patterning. Further research should be conducted in order to:

1. Determine whether the language of textbooks in different subject areas and at different ability levels is significantly different from the language experience and expectations of the intended readers.

2. Establish criteria for effectively accommodating instructional materials to all aspects of the linguistic experience and expectations of the intended reader.

3. Determine whether repatterning reading material so as to proportionally approximate the learner's syntactic patterning will have an effect upon readability at different grade levels, in different content areas, and as measured by a variety of qualitative and quantitative criteria.

Comprehension:

Much additional research is needed in order to identify the factors comprising, and to evaluate the efficiency of current methods of testing, comprehension. (Cloze tests appear to be more global in nature than multiple-choice tests which seem to measure disparate elements of those factors currently thought to contribute to comprehension. However, research is needed in order to isolate those factors which comprehension tests, do, in fact, measure.)

A FINAL OBSERVATION

The current investigation suggests that repatterning textual material in a content area in terms of only the current criteria of vocabulary difficulty and sentence length may result in the creation of an artificial language that is syntactically markedly different from the linguistic experience and expectations of the learner. Attempts to manipulate sentence length may ignore intra-sentence factors which significantly contribute to sentence length. Attempts to simplify vocabulary may result in the creation of structures which inadvertently embed concepts in a manner which may result in syntactic structures and, concomitantly, a semantic conceptual load which are out of the learner's realm of expectation and experience.

The foregoing does not propose that the current criteria of sentence length and vocabulary difficulty are not effective indices which to measure language that is naturally produced.

It is rather the reversal of the process, the utilization of these indices in order to restructure language which is then measured by these very same indices, which is here called into serious question. The present study suggests that any process designed to restructure language should incorporate the insights of both the psycholinguistic model of the reading process and generative-transformational grammar.

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